Relative Speed Lab - 5

Any last minute questions?

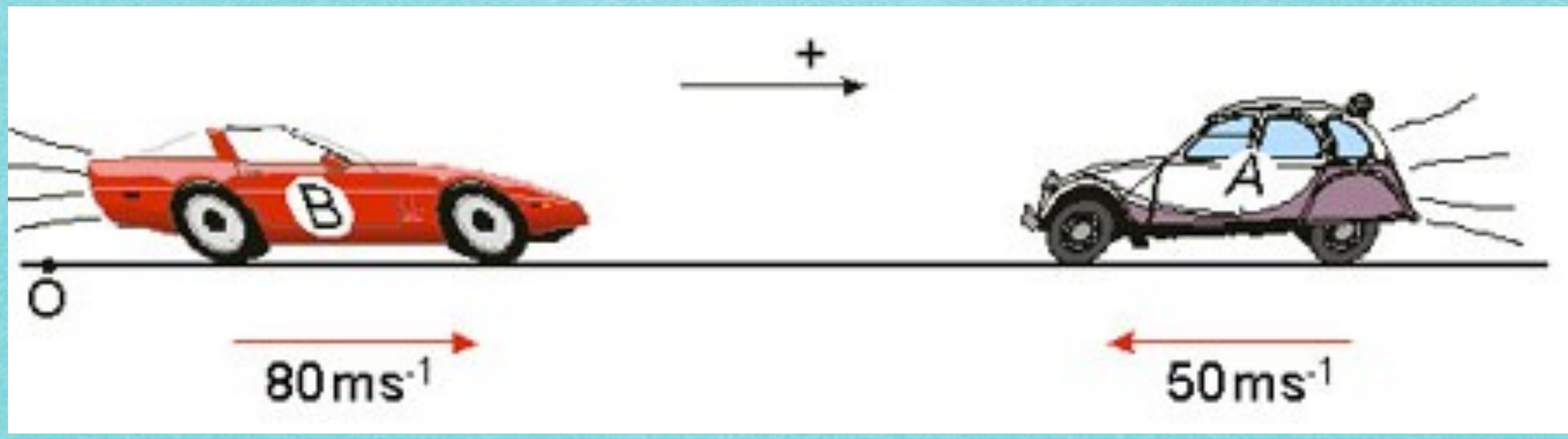
This is worth a lot of points, we have worked on this for 3 days! --- HAND IT IN----

RELATIVE SPEED Practice ?'s

- A person kayaking down the Scioto river has a velocity of 12 m/s. A dog swimming the same direction has a velocity of 9 m/s. What is their relative speed to one another?

Try another one!

- What is the speed of car A relative to car B??



- Note that the speeds 80m/s and 50 m/s are the speeds of the cars relative to the ground or a stationary bystander

Any questions??

- There will be relative speed questions on the "quest" coming up before the quarter ends...
- The good news... 62% of you already sort of got the idea of relative speed last week:
- You are riding in a bus, moving slowly through heavy traffic at 2.0 m/s east. You hurry to a seat at the back of the bus at 3.0 m/s west. What is your velocity relative to an observer on the sidewalk?
- a. 1.0 m/s west b. 5.0 m/s west c. 1.0 m/s east d. 5.0 m/s east

19	68 62%	16 15%	20 18%	4 4%

- What about speed of the person walking relative to the bus?

Graphing review

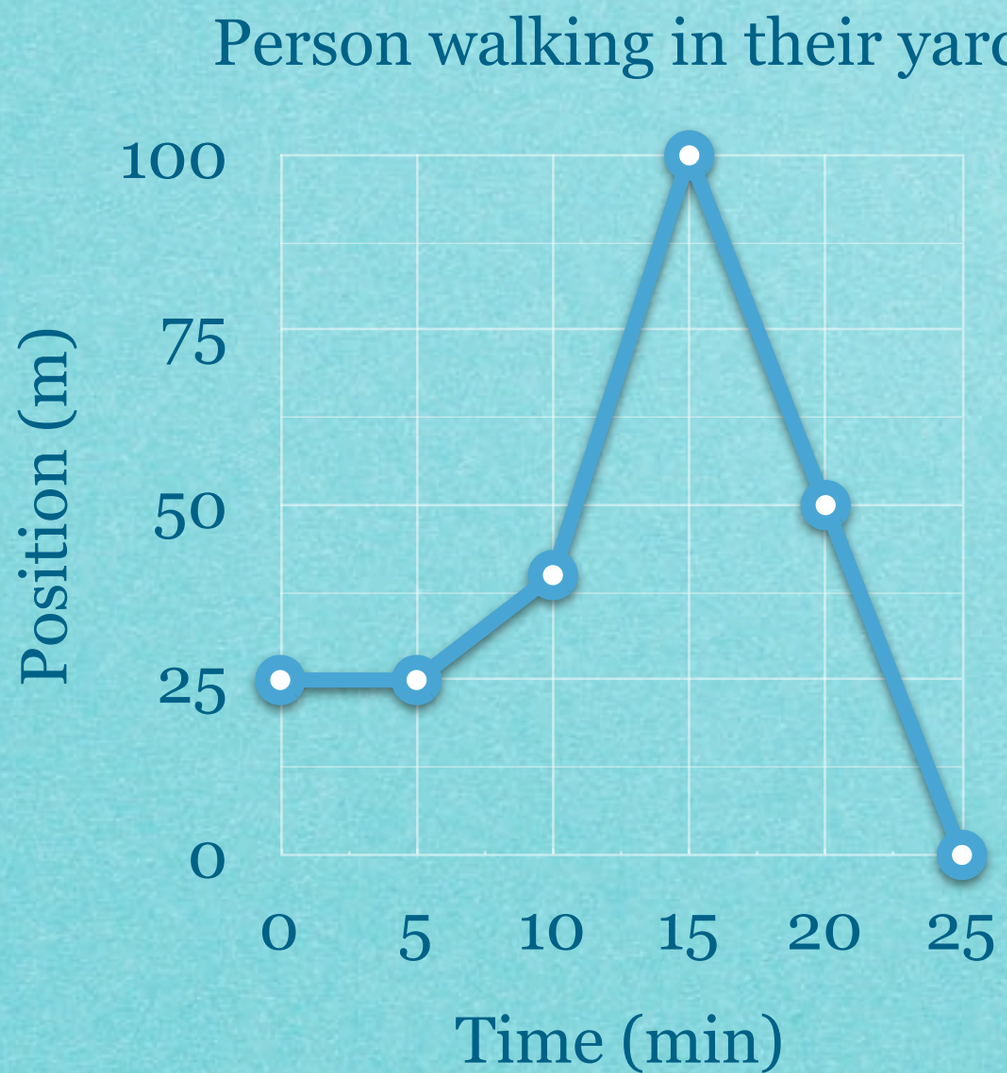
- If this is a position versus time graph, what does the slope represent?

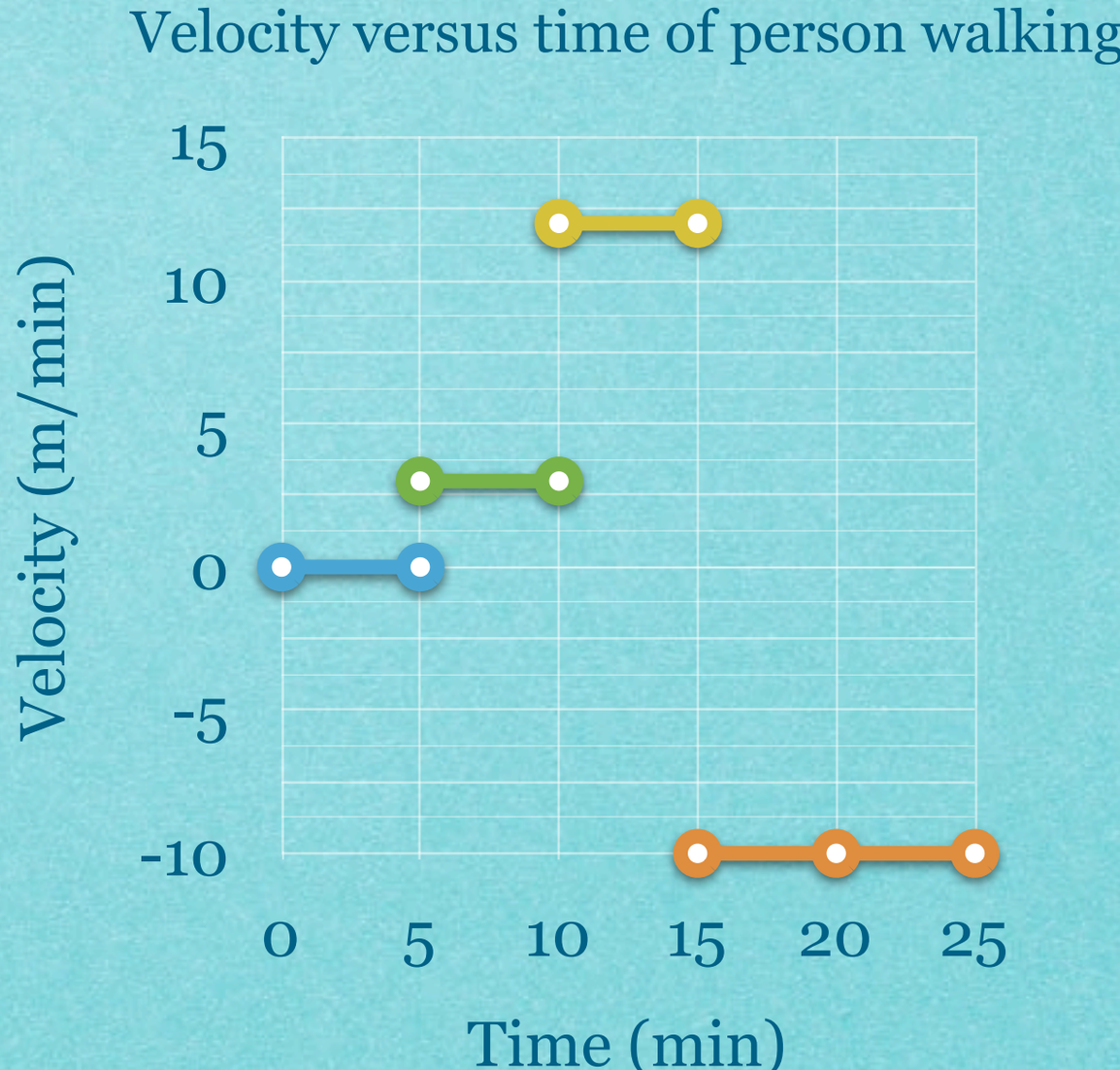
- Could we then take the slope and graph the data on a velocity versus time graph?

- A steeper slope means…
  A negative slope means…..

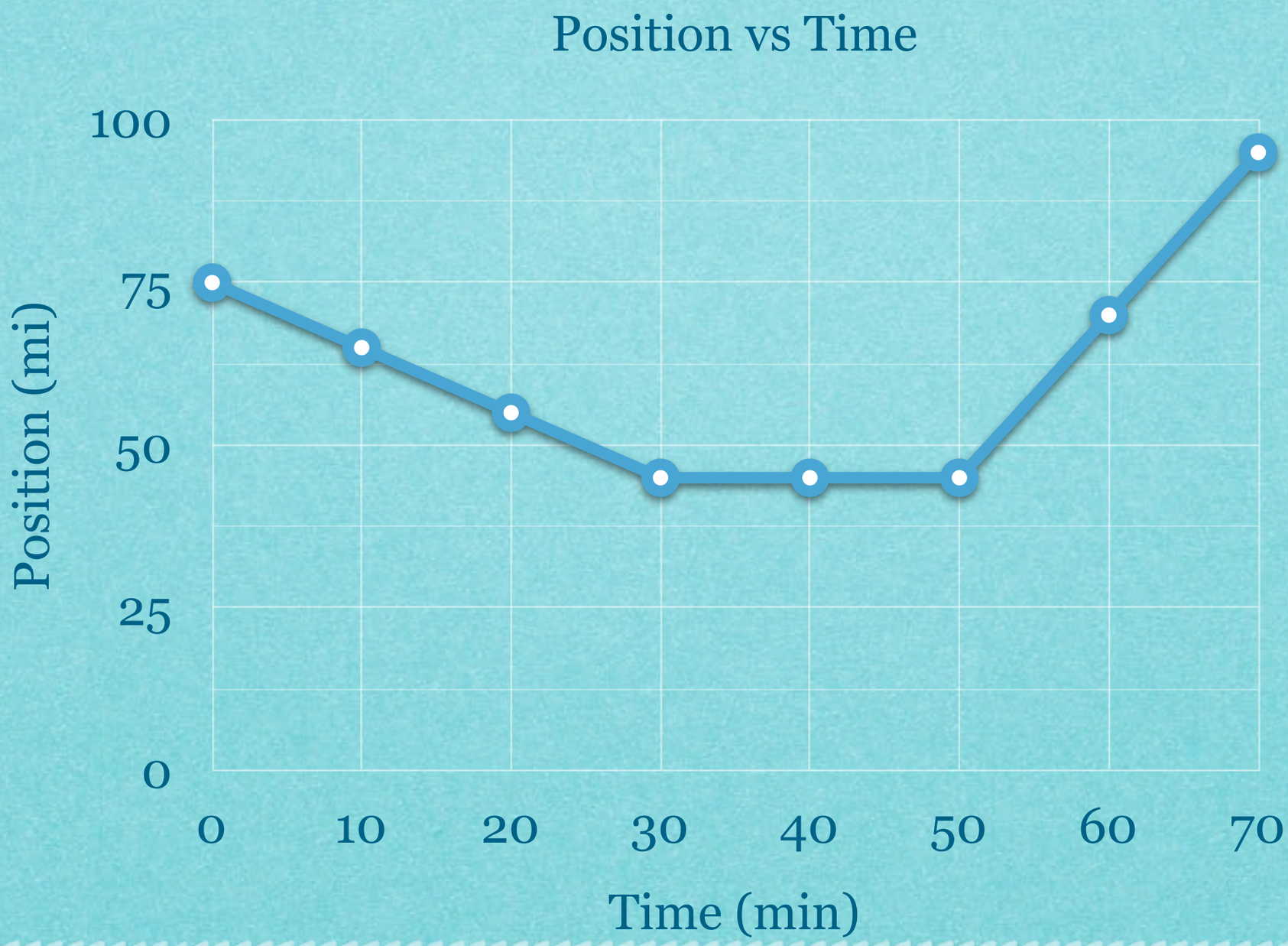
Introducing VELOCITY VERSUS TIME GRAPHS!

- Of course we could!

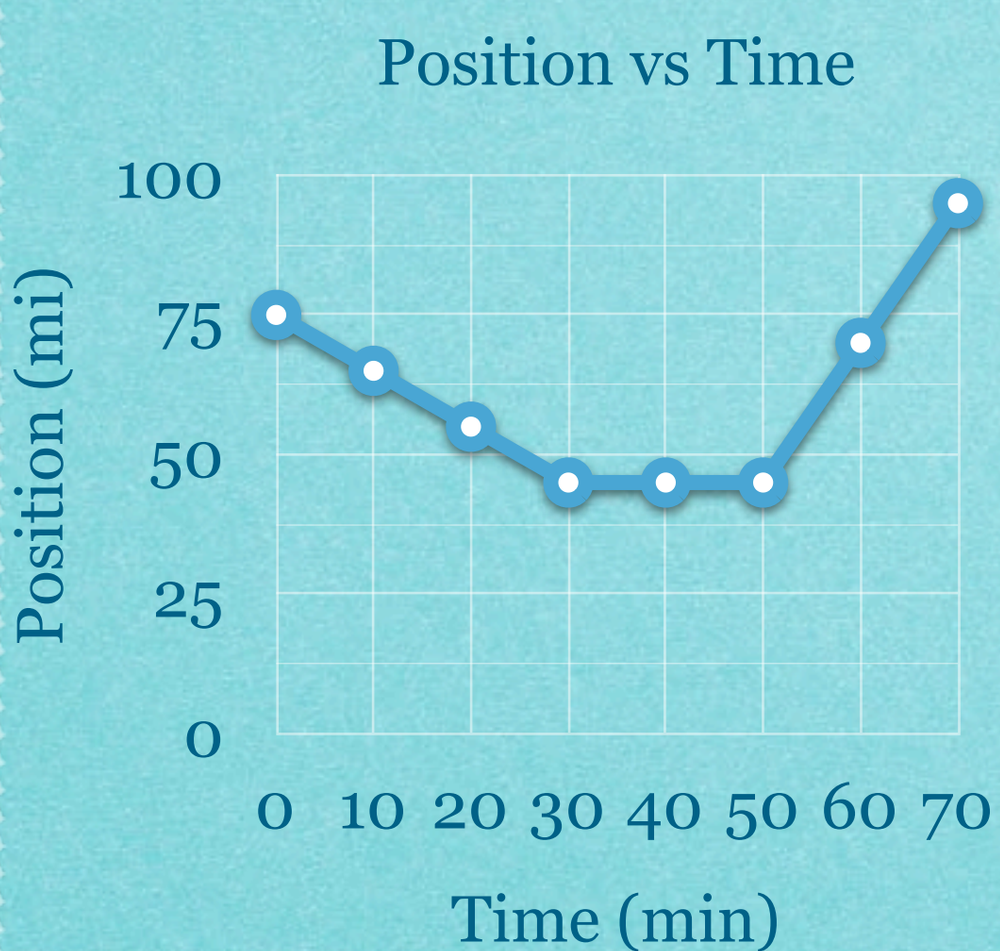


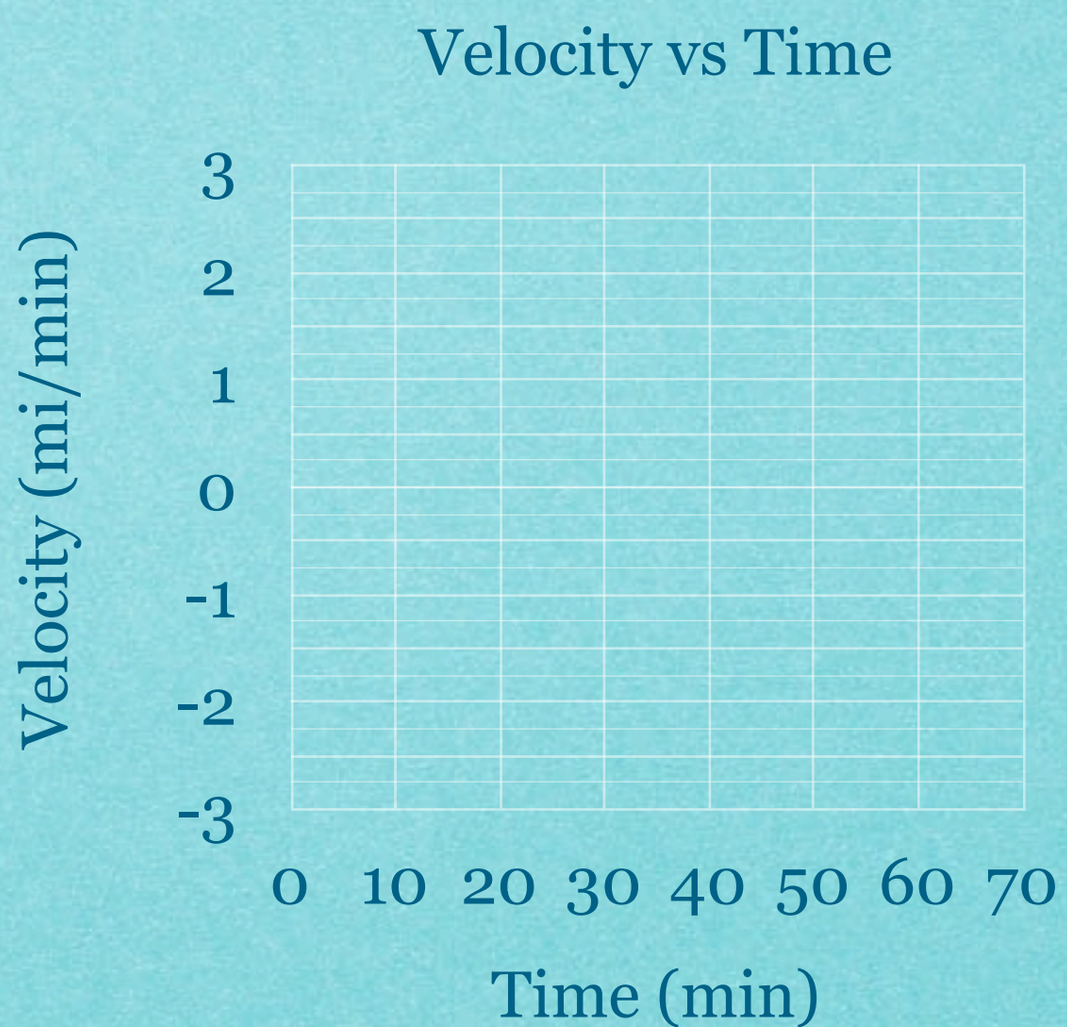


Now you try one on your own!



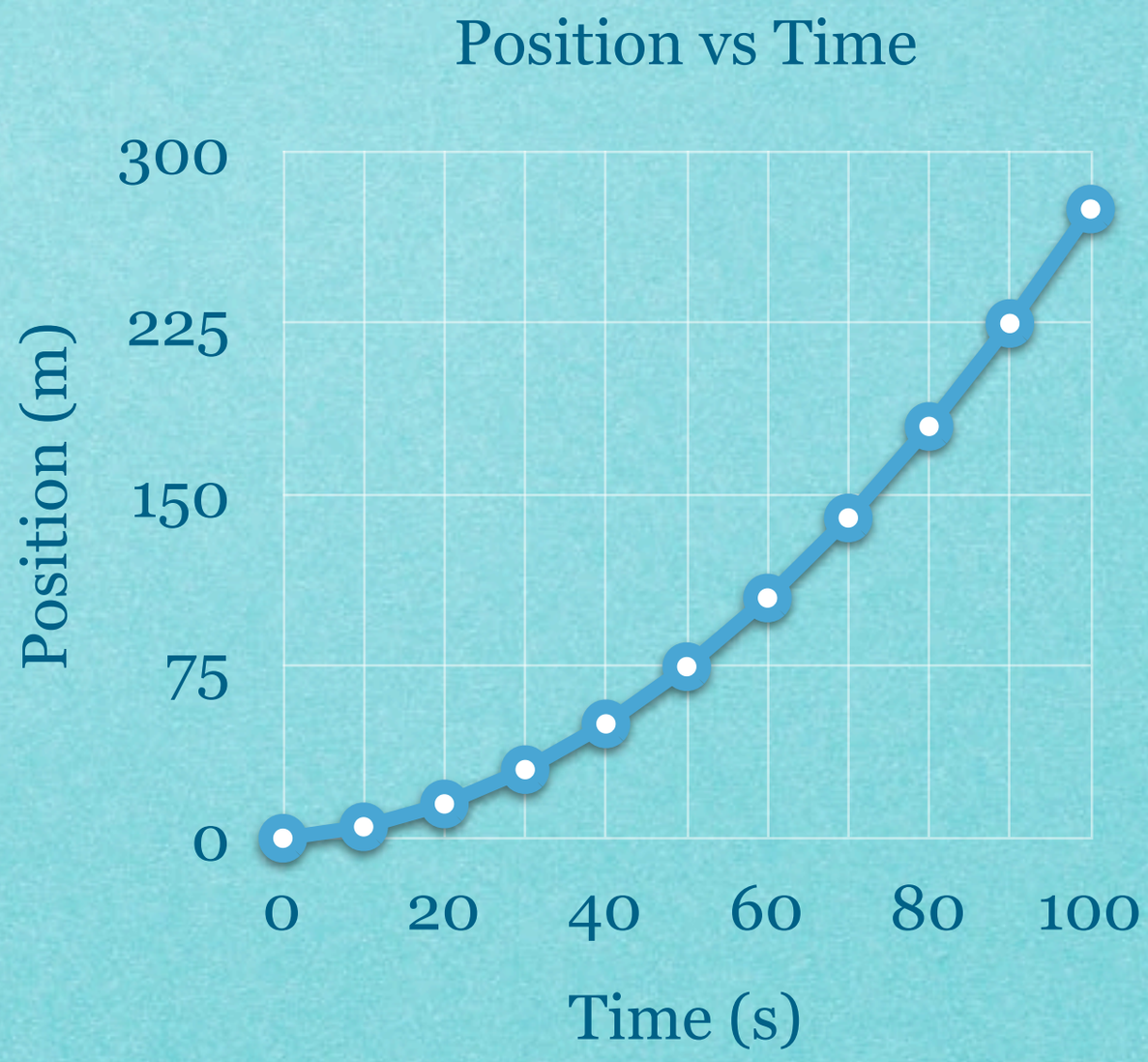
How'd you do?!


Position vs Time
Position (mi)
100
75
50
25
0
0 10 20 30 40 50 60 70
Time (min)

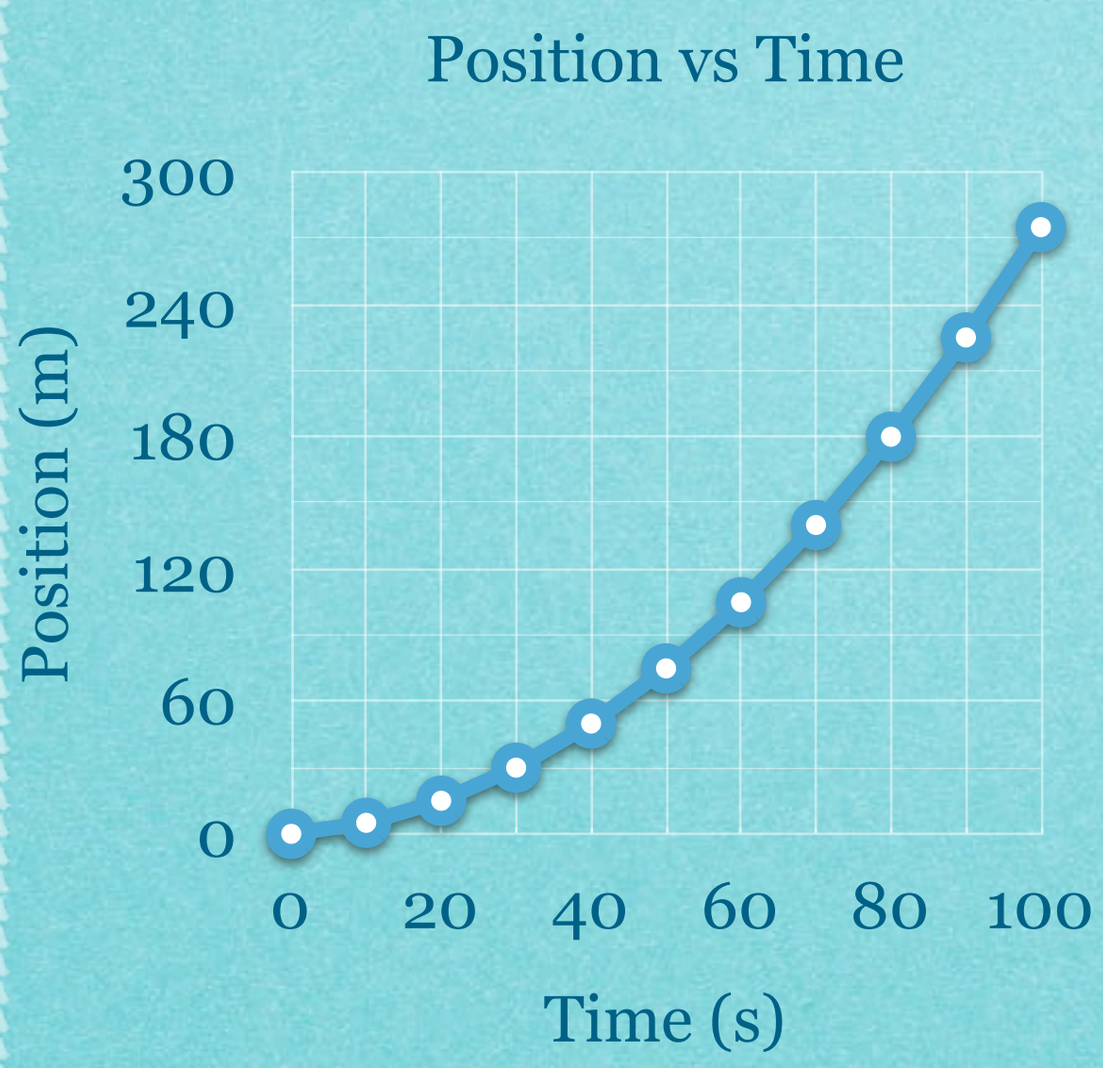

Velocity vs Time
Velocity (mi/min)
3
2
1
0
-1
-2
-3
0 10 20 30 40 50 60 70
Time (min)

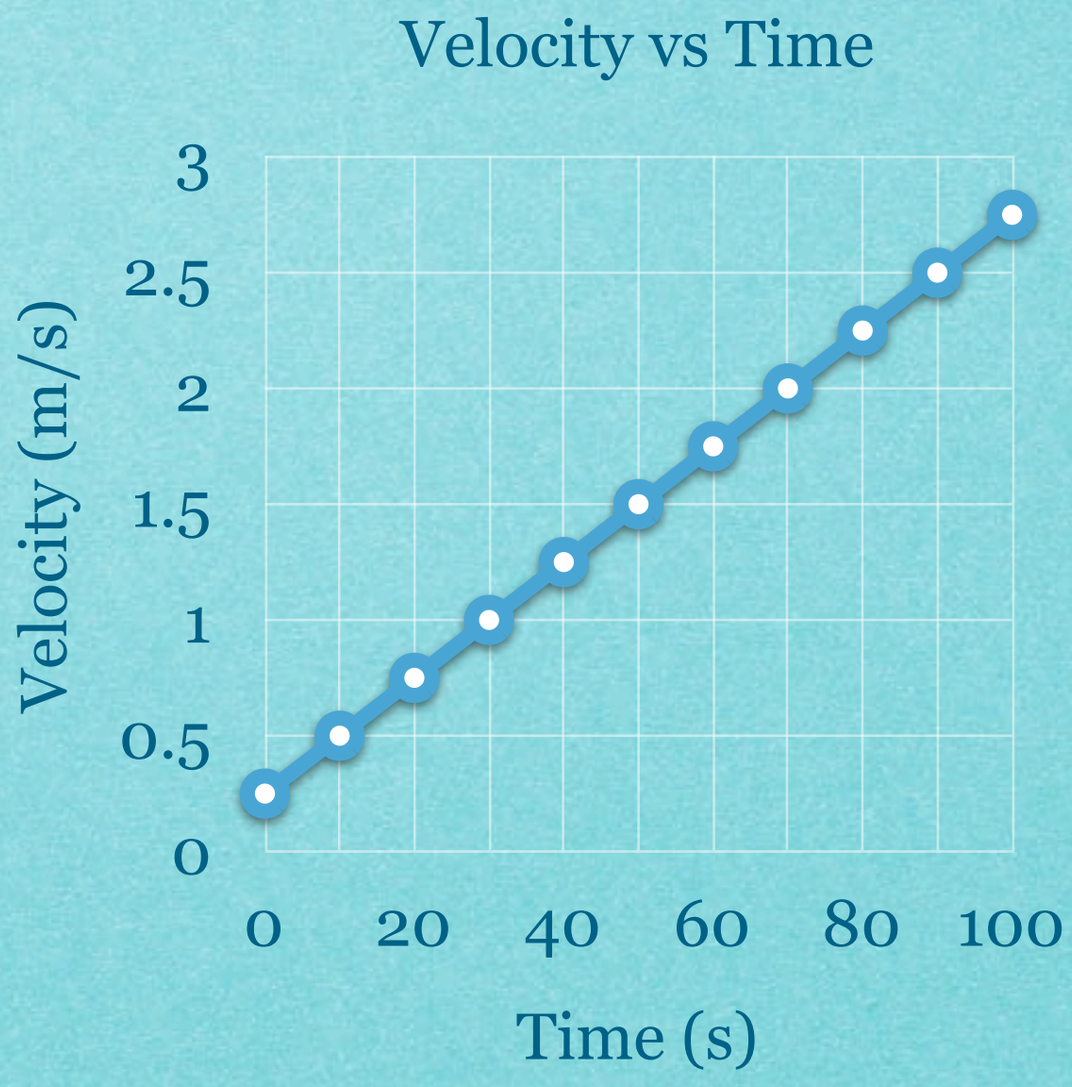
What if... the object was not moving at a constant velocity?

- Could you still draw a velocity versus time graph for a velocity that was changing?



Yes! If the objects velocity is changing at a constant rate, then the velocity versus time graph would look like this:





Acceleration

What is it?

is a vector quantity that is defined as the rate at which an object changes its velocity. An object is accelerating if it is changing its velocity.

acceleration = change in velocity / time

- $a = (v_f - v_i) / t$ also written $a = \triangle v/t$
- Unit of acceleration (a) = m/s^2
- Unit of velocity (v) = m/s
- Unit of time = s

Ways velocity can change:

- Change in speed (speeding up or slowing down)
- Changing direction
- Or both!

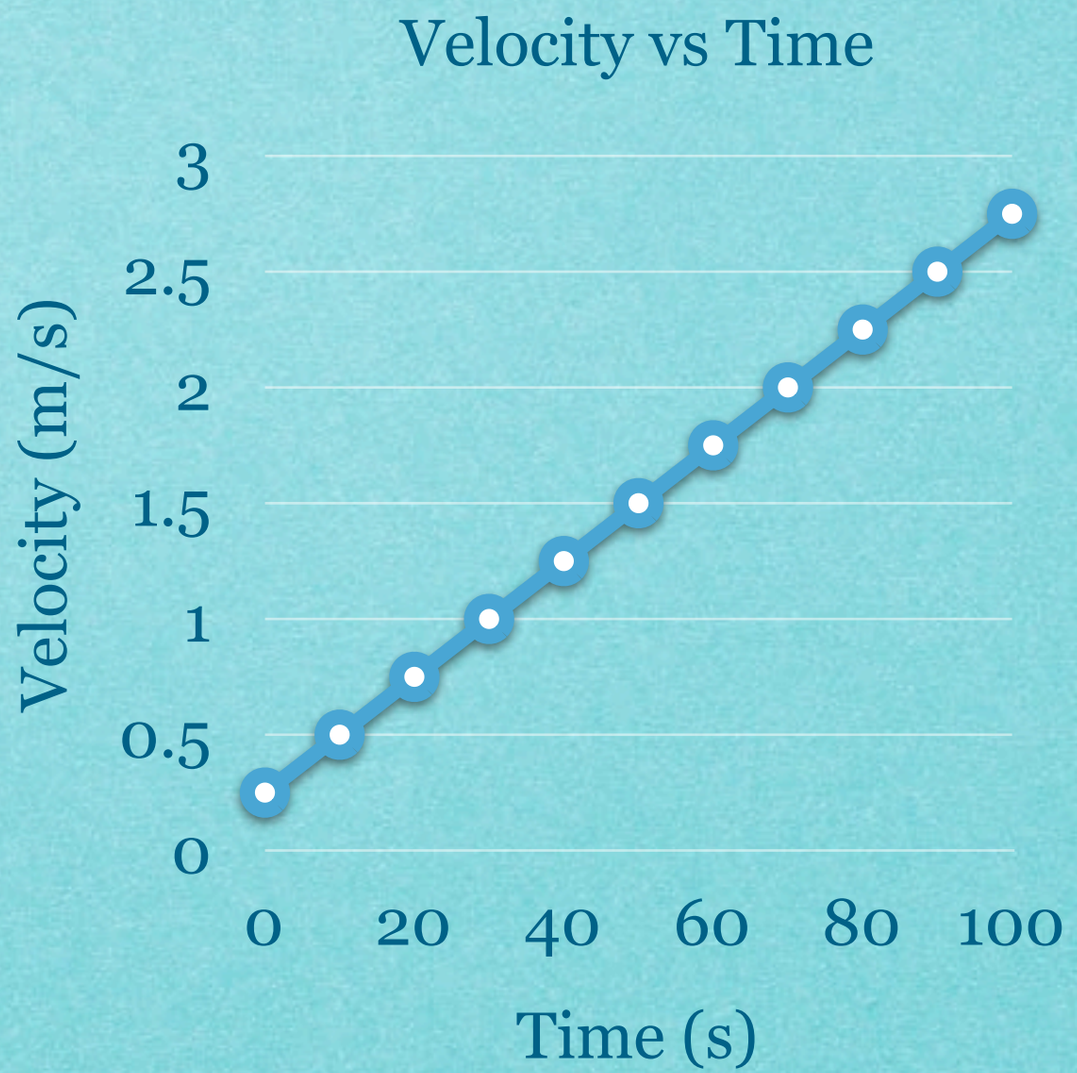
It is a vector quantity

- Acceleration can be POSITIVE or NEGATIVE
- Positive acceleration - speeding up - velocity and acceleration are in the same direction
- Negative acceleration - slowing down - velocity and acceleration are

Back to the velocity versus time graph....

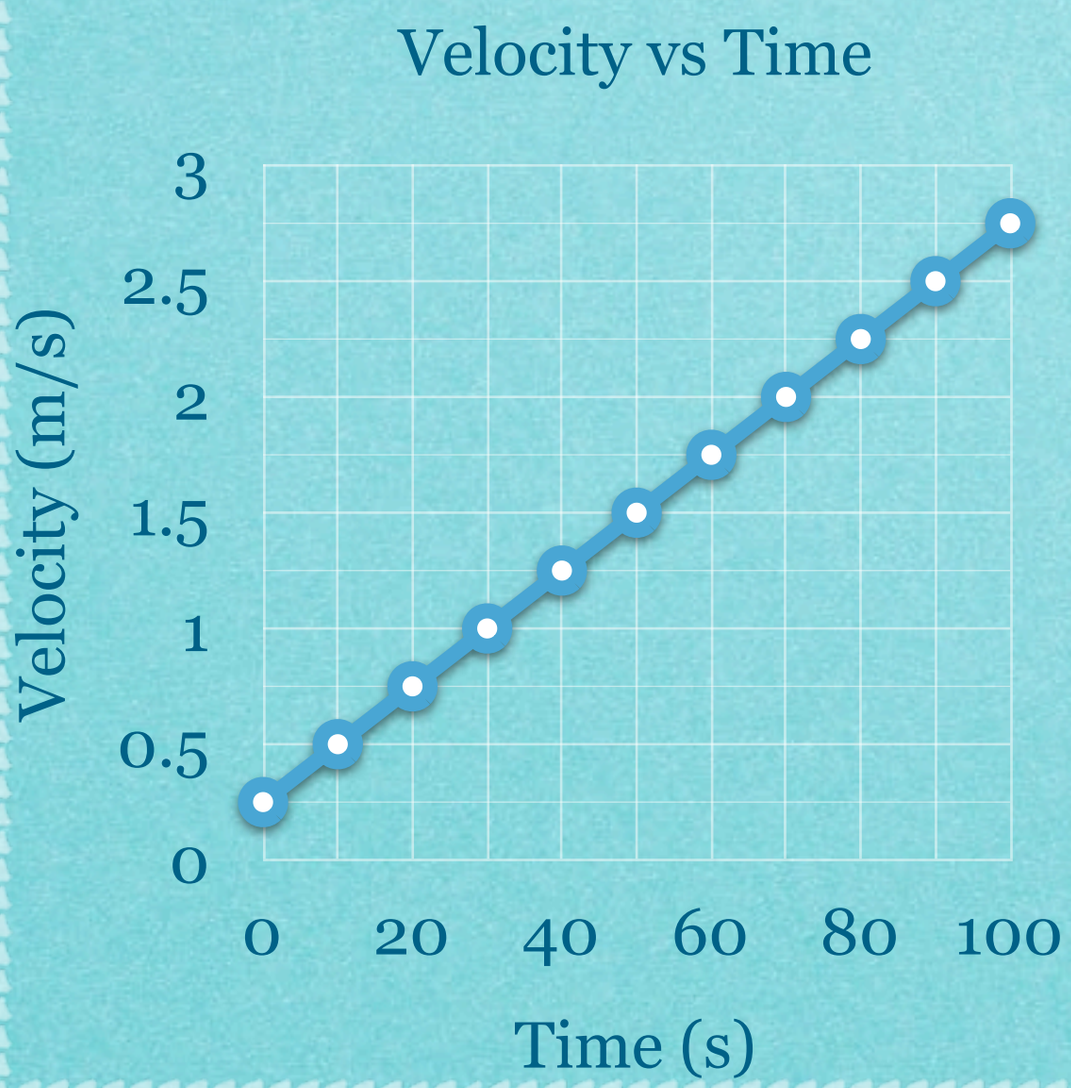
- What does the diagonal line tell us about the velocity?

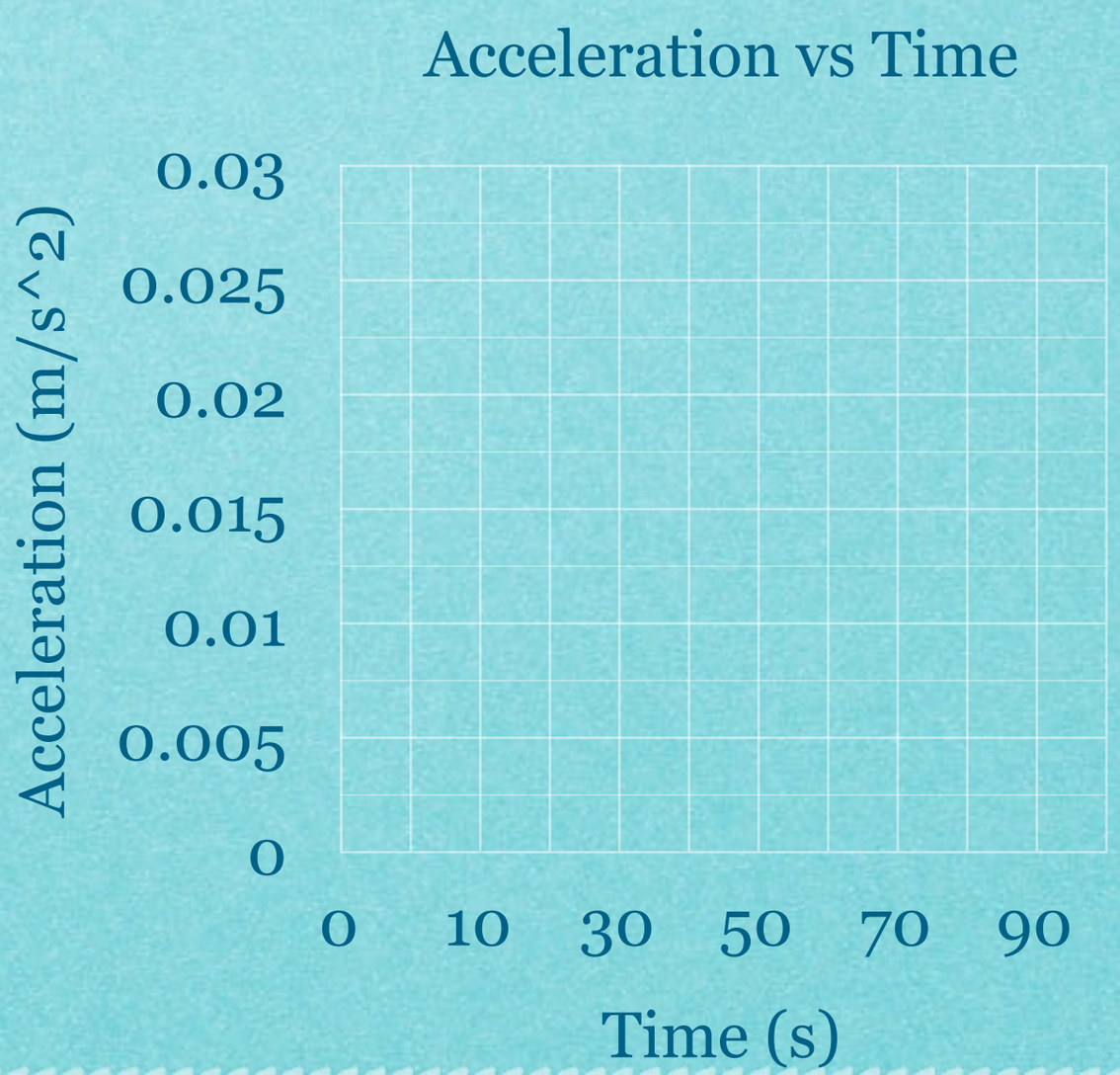
- The object is....



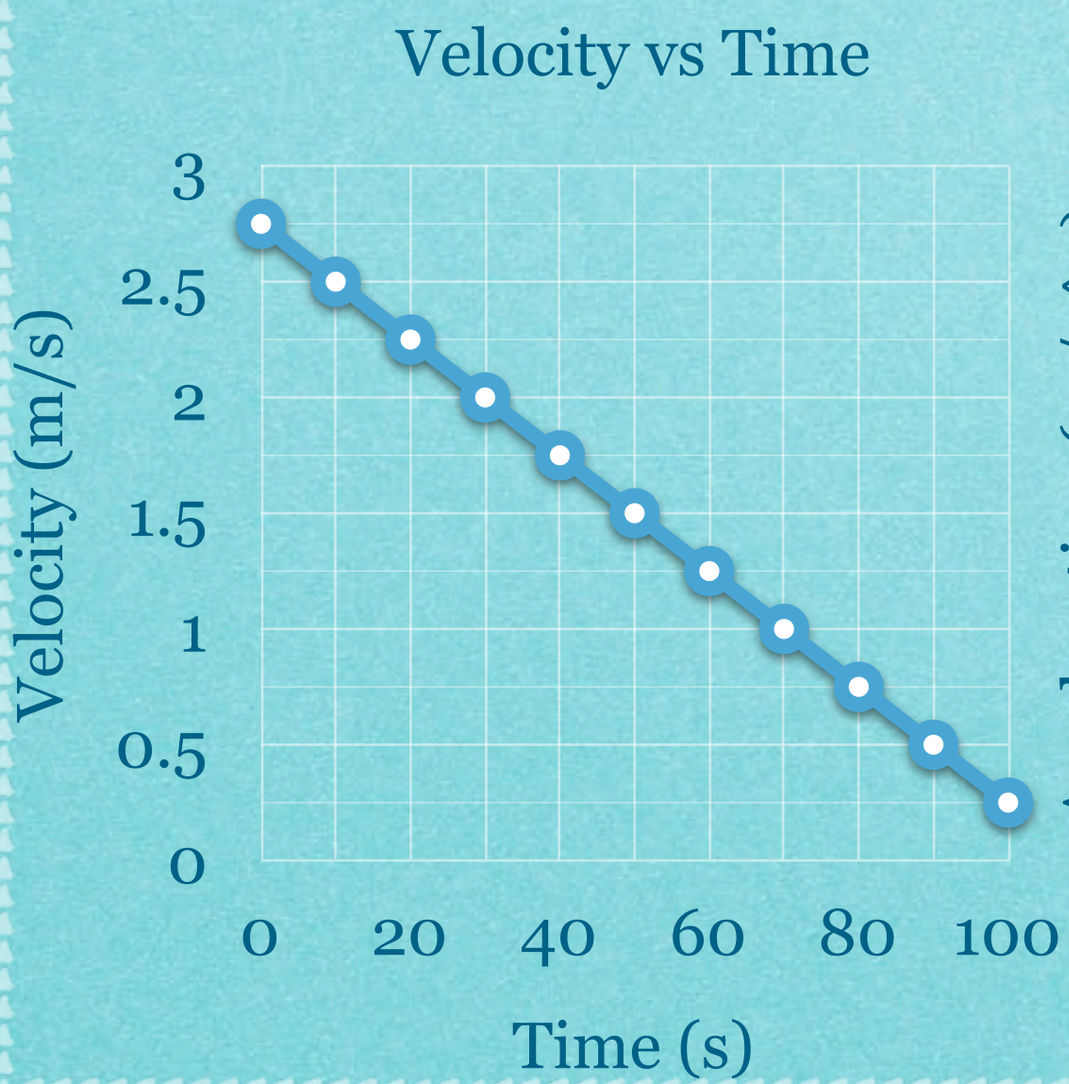
That means we have an acceleration!!!!

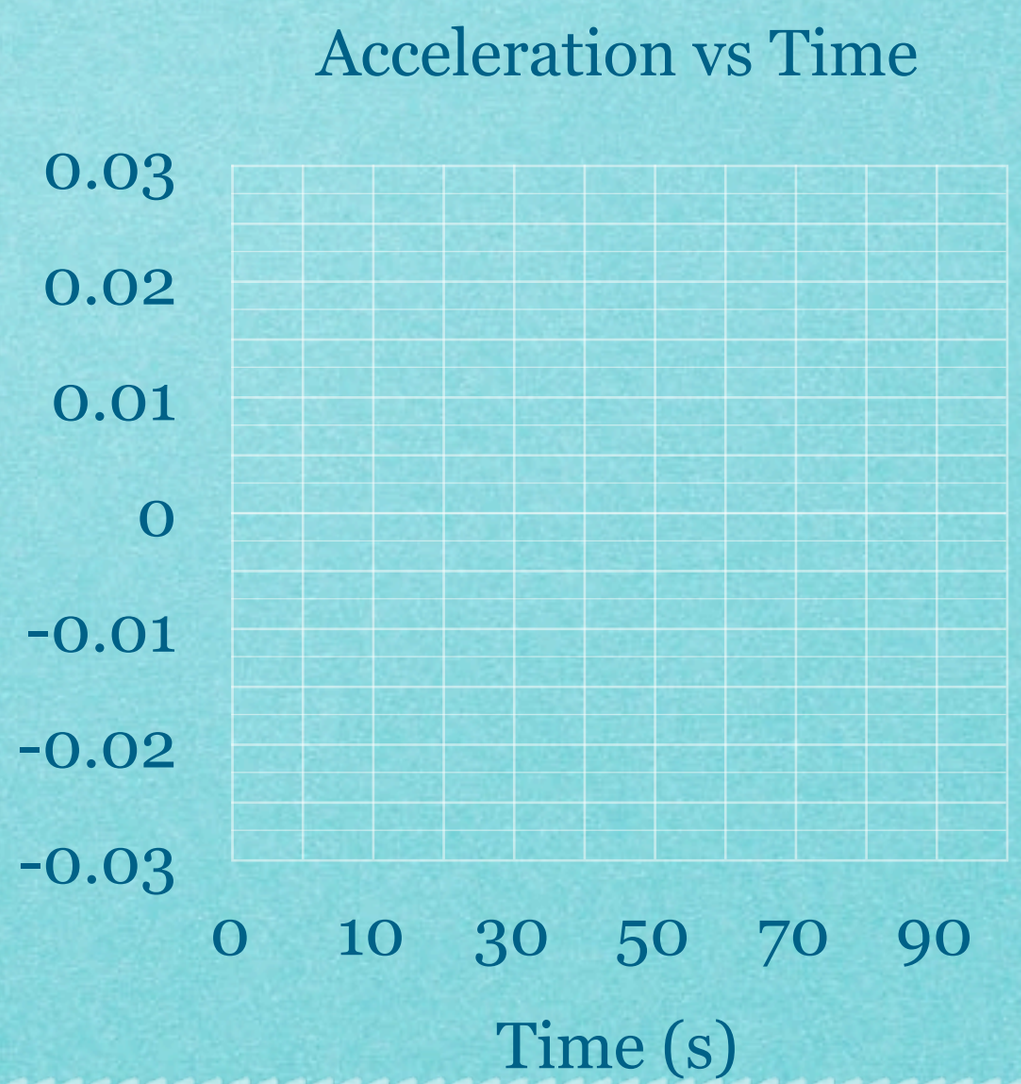
- Is it a constant acceleration??? Lets graph it!



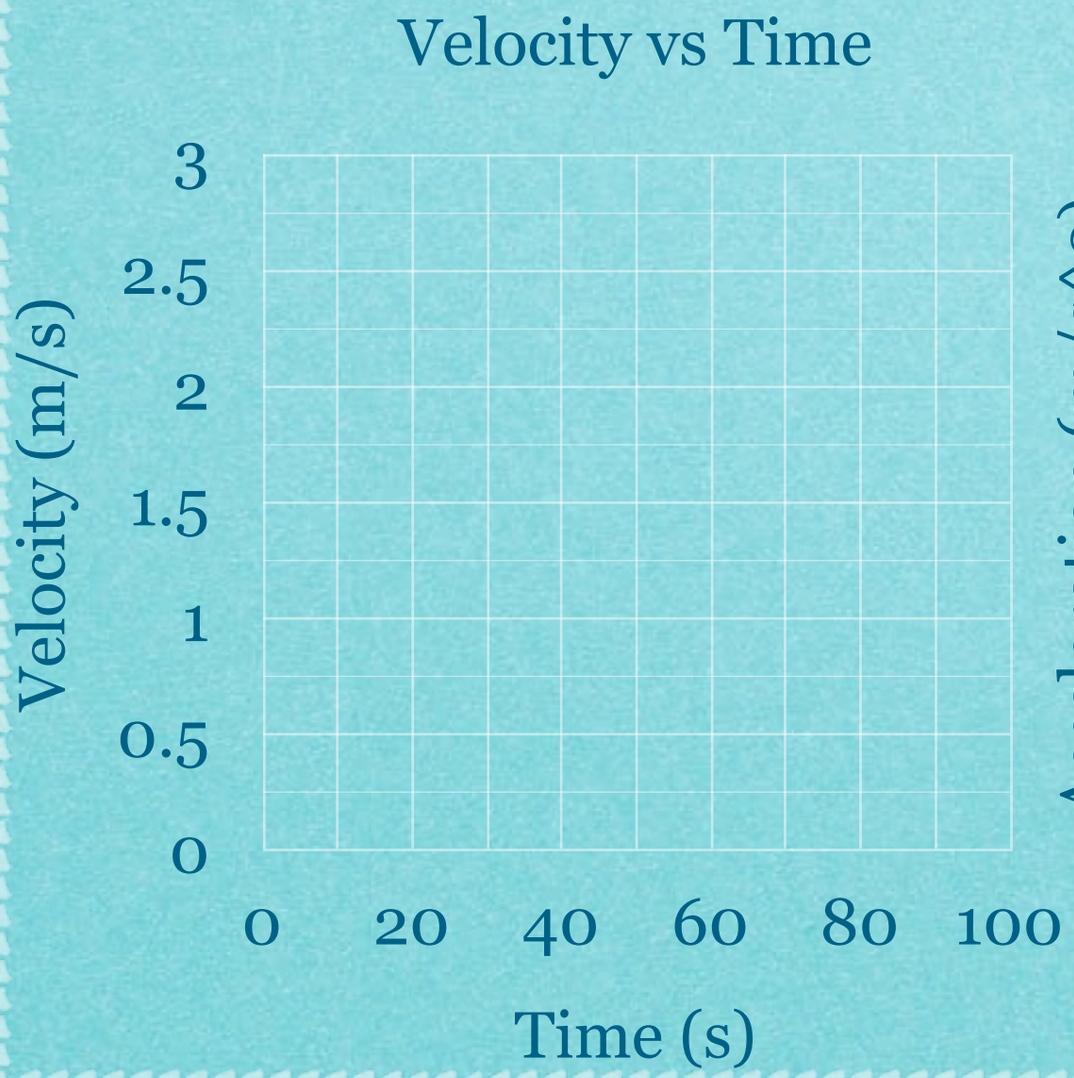


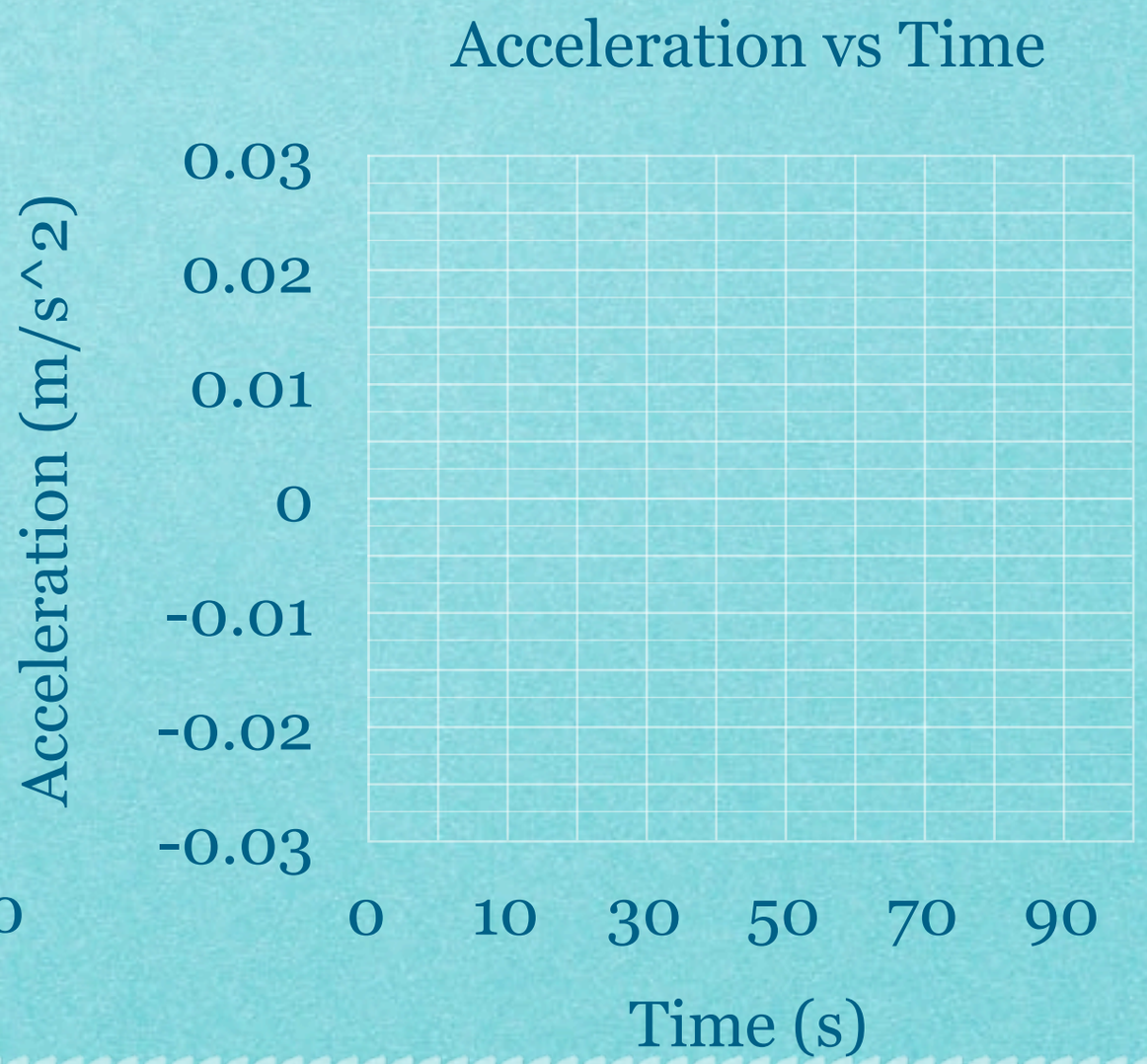
What if we have a constant negative velocity?





What if there was a direction change....





Graphing Review...

- Try this on your own.... I want to know what you know and if you can take what you know about position time graphs and the new information you have learned about velocity versus time / acceleration versus time graphs and apply it!!

HOMEWORK!!!!

- If you do not finish, this is your homework!!
  PLEASE PLEASE PLEASE.... USE YOUR NOTES TO HELP GUIDE YOU!

- Ask for help if you feel lost!